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Sağlıkta Dönüşüm Programının Aşılama Oranlarına Etkisinin ARDL Yöntemi İle İncelenmesi

Pınar YALÇIN BALÇIK* Seval SELVİ SARIGÜL** Murat KONCA***

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Öz

Bir ülkenin gelişmişlik düzeyinin belirlenmesinde; eğitim, ekonomik durum, doğuşta beklenen yaşam süresi gibi unsurların yanı sıra sağlık hizmetlerinin de önemli payı mevcuttur. Sağlıklı nesillerin bir sonraki kuşakta da devam ettirilmesi noktasında önemli rol oynayan çocuk sağlığı, sağlık hizmetlerinin geliştirilmesi ve sürekliliğinin sağlanması noktasında hassasiyetle irdelenen bir konudur. Çocuk sağlığı konusunda önem arz eden konulardan biri olan aşı programlarının uygulanması, yürütülmesi, bu alanda yapılacak politikaların belirlenmesi, devletin yerine getirmesi gereken zorunlu görevlerinden biridir. Bu çalışmanın amacı, Türkiye sağlık sisteminde köklü değişiklikler getiren Sağlıkta Dönüşüm Programı'nın (SDP) ve sağlık personeli sayılarının aşılama oranları üzerine etkisini değerlendirmektir. Çalışmada,1990-2015 yılları arası Difteri-Boğmaca-Tetanoz (DaBT) aşısı oranları, OECD veri tabanında yer alan veriler ile değerlendirilmiştir. Araştırmanın bağımlı değişkeni aşılama, bağımsız değişkenleri ise SDP, 1.000 kişiye düşen hekim, hemşire ve ebe sayıları olarak belirlenmiştir. Veriler bir zaman serisi yöntemi olan ve değişkenler arasında uzun ve kısa dönemde herhangi bir ilişkinin olup olmadığını değerlendiren ARDL yöntemi ile analiz edilmiştir. Çalışma kapsamında analizler %95 güven düzeyinde Eviews 9 Programından yararlanılarak gerçekleştirilmiştir. Yapılan analiz sonucunda kısa dönemde hekim sayısının, uzun dönemde ise SDP'nin aşılama oranları üzerinde istatistiksel olarak anlamlı bir etkisinin olduğu; hemşire ve ebe sayılarındaki artışın ise aşılama oranlarına herhangi bir etkisinin olmadığı tespit edilmiştir. Aşılama oranlarındaki artışın SDP'nin önemli bir bileşeni olan aile hekimliği uygulaması ile beraber gerçekleştiğini söylemek mümkündür.

Anahtar Kelimeler: *ARDL, Sağlıkta Dönüşüm Projesi, Aşılama, Aile Hekimliği*

*Dr. Öğr. Üyesi, Hacettepe Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Sağlık Yönetimi Bölümü Öğretim Üyesi, pyalcin@hacettepe.edu.tr

**Öğr. Gör., Erzincan Binali Yıldırım Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Sağlık Yönetimi Bölümü Öğretim Görevlisi, seval.selvi@erzincan.edu.tr

***Arş. Gör., Hacettepe Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Sağlık Yönetimi Bölümü, konca71@gmail.com

Examining The Effects of Health Transformation Program on the Rates of Vaccination via ARDL Method

Abstract

While determining the level of development for a country, besides some factors such as economy, education, estimated life duration in birth, health services have a significant role. Child health which has an important role on passing down healthy generation for future is an issue that is sensitively probed in terms of improving health services and sustaining these services. The application of vaccination programs which is one of the important topics on child health and determination of policies in this concept are some of the bounden duties of government. The aim of this study is to evaluate the effects of the Health Transformation Program (HTP) and number of health personnel on vaccination rates. In this study, the rates of vaccination on Diphtheria-Pertussis-Tetanus (DTP) for the period 1990-2015 were examined with the data given in OECD database. The dependent variable of this study was determined as the vaccination and, the independent variables of it were designed as HTP, doctor numbers per 1000 citizens, the numbers of nurses and midwives. The data was analyzed via ARDL approach which is a time series method and also a method that is examining whether there is a relationship between variables in terms of short and long term or not. Within the scope of this study, the analyses were conducted with the help of Eviews 9 Program in the level of 95% on reliability. As a result of the analyses, it was confirmed that there was a statistically meaningful effect of doctor numbers on vaccination rates in the short term and there was an effect of HTP on vaccination rates in the long term; additionally there was no meaningful effect of the increase on the numbers of nurses and midwives on the rates of vaccination. It is possible to say that the increase in vaccination rates is accompanied by a family medicine practice which is an important component of HTP.

Keywords: *ARDL, Health Transformation Project, Vaccination, Family Medicine*

Introduction

While determining the level of development for a country, besides some factors such as economy, education, estimated life duration in birth, health services have a significant role. Child health which has an important role on passing down healthy generation for future is an issue that is sensitively probed in terms of improving health services and sustaining these services. The application of vaccination programs which is one of the important topics on child health and determination of policies in this concept are some of the bounden duties of government.

Each society has faced with the problem on overcoming many diseases because of changing demographics and geographic features. Many of those diseases affect children between 0-5 years and they cause death. In the societies having a changeable disease series, the significance of immunization has been increasing day by day. Vaccination, one of the methods for immunization, is an application known as the most effective and economic ones to protect both individual's and societies' health. The term of "vaccine" is defined as the weakened disease virus solution that is injected in human or animal body to develop immunity to any diseases. Accordingly, the use of vaccine in a program or plan is called as "vaccination". Vaccine is an application that is injected to a group of people having risk to get a disease for the aim of preventing undesirable results (Birinci Basamak Sağlık Çalışanları İçin Aşı Rehberi, 2018, p. 9-13).

Vaccine is term that directly affects health in terms of both individuals and societies; it increases the level of welfare with the benefits for individuals, and also it makes next generation healthy thanks to decreasing mortality and morbidity. For this reason, vaccines applied especially in infancy and childhood are applications which aim to decrease infant and child deaths that is thought as one of the basic indicators of development in health. Vaccination decreases not only death or disease but also disability that may occur before or after a disease. Additionally, vaccine prevents growth deficiency depending on nutrition as breaking the chain of poor nutrition. From a mother's point of view, it is a real that vaccines injected to mothers during the pregnancy decrease malformations in babies. Moreover,

vaccination supplies economic gain in terms of health finance since the costs of diseases are higher than costs of preventing health services (Çavuşoğlu, 2000, p. 24).

As increasing the actions on vaccination around the world, The Expanded Program on Immunization designed by World Health Organization (WHO) in 1974 was started in Turkey by Ministry of Health in 1981. After 1985, the rates of vaccination had a tendency to increase with the help of the policy called as "Turkey Vaccination Campaign" in Turkey. Yet, those applications remained incapable to reach the desired results. However, 6 kinds of vaccines supplied with the government and also included in the program until 2000 have been progressively increased after 2002 and nowadays, the number of those vaccines have been 13 in childhood (Gülcü & Arslan, 2018, p. 34-43).

In Turkey, with HTP that was started in 2003, there have been essential changes in health sector. The application of Family Medicine has been started and after that, besides supplying health services to larger groups, prenatal care services, following puerperal period; immunization services and their pursuit have fell into responsibilities of family medicine (Hazama, 2015, p. 36-53). It is stated that vaccination is one of the basic responsibilities for family medicine in terms of both increasing cost effectiveness and maintaining a holistic perspective for the health of society (Wonca Europe, 2002, p. 9-11).

Family medicine was firstly applied as a pilot study in Turkey at the date of 15.09.2005 and then it has been gradually applied in other cities and finally it was begun to be applied in all cities in Turkey in 2010 (Akkavak, 2018, p. 35-37). Within the scope of HTP, without making any discrimination, as determining the general framework of first step health organizations which have been reached easily, quickly and equally by people (Yıldırım, 2013, p. 25); vaccination activities and follow-up process of them have been taken under the control. In 2003, as the beginning of HTP, there have been steady results on this issue with the increase in baby-friendly hospitals, organizing vaccine campaigns, the application of some policies on increasing awareness, developing immunity for children living in village or rural areas via mass vaccination applications (Gülcü & Arslan, 2018, p. 35-36). Additionally, there have been essential changes on preventive health services with the help of Family Medicine application that is a part of HTP. Between 2005-2007 years, there has been seen an increase on the numbers of vaccinated children and babies in Düzce, Adıyaman, Bolu, Denizli, Edirne, Elazığ, Gümüşhane, Eskişehir, Isparta, İzmir and Samsun thanks to the pilot scheme in those

cities. In 2010, the rates of vaccination have begun to be increased in all cities since the pilot scheme has been applied in around the whole country (Nesanır & Erkman, 2010, p. 493-504).

In this study conducted in this context, the main aim is to reveal the effects of HTP that is an essential reform period started in 2003 on the rates of vaccination for infants and children.

1. Methodolgy

The aim of this study is to evaluate the effects of current policies on vaccination as revealing the effect of HTP on children and infants' vaccination rates. In the study, the examination was concluded as referring the data given in Organization of Economic Cooperation and Development (OECD) database between 1990-2015 years about the vaccines' rates on Diphtheria-Pertussis-Tetanus (DPT). Thanks to this study which was conducted as using Autoregressive Distributed Lag (ARDL) Bounds Testing Approach, the long and short term effects of the current policies on vaccination rates were declared. ARDL bounds testing approach is a time series analysis that was developed by Mohammad Hashem Pesaran and Yongcheol Shin in 2011. It is a kind of method that is used to state a static combination of at least two non-static series during in time and to test co-integration between those two series (Pesaran et.al, 2001, p. 290).

ARDL bounds testing approach is combined with three steps. In the first step, it is tested that whether there is a long term relationship between the variables that are included in the study or not. If there is a co-integration relationship between those variables; in the following steps, the long and short term elasticity has been orderly obtained (Narayan & Smyth, 2005, p. 96-115).

This study has researched the effects of HTP which is stated in this study on the vaccination rates of infants and children. Within the scope of this study, the effects of the total number of nurses and midwives per 1,000 citizens, the number of doctors per 1,000 citizens and HTP on DTP vaccination have been revealed via ARDL approach. As a time series analysis with adopting ARDL approach, this study has been concluded with the data presented in OECD database between the years 1990-2015 and the explanations of variables that were used in this study were given in Table 1.

Table 1. Variables of the Study

Dependent Variable	**Abbreviation**
Triple Combination Vaccine (Diphtheria-Pertussis-Tetanus)	DPT
Independent Variables	
The total number of nurses and midwives per 1000 citizens	EBHEM
The number of doctors per 1000 citizens	HEK
Health Transformation Program	HTP

In the study, first of all, logarithmic transformation was applied to the variables in order to harmonize anomalous data in data series and to normalize the data. After that, the stability of data on variables was tested since there has been a possibility of getting spurious regression concept in time-series analysis. Spurious regression occurs due to the similarity of variables in trend tendency during time-series although there is statistically not a meaningful relationship between the variables indeed. In spurious regression models, a high explanatory coefficient (R^2) is obtained even if there is not an important effect of independent variables on dependent variables. This is a deceptive case and for this reason, the stability of data should be controlled before analysis in time-series analysis (Grange & Newbold, 1974: 117; Gujarati, 2009). Therefore, in this study, the stability of variables was tested via Augmented Dickey Fuller (ADF) test before ARDL analysis and it was seen that the variables were not static. Hence, the variables which were firstly analyzed via logarithmic transformation were become stable as stating their first order differences. In the data about all variables, it was seen that first differences were static and stable (Table 2). According to ARDL analysis, all of the variables in the model should be static as in level (I(0)) or in the first order (I(1)) (Pesaran et.al., 2001: 289-326). In this respect, it can be said that the model in the study is suitable for ARDL analysis.

2. Findings

In this study, as it was stated above, firstly logarithmic transformation was applied for the variables and then the stability of variables was tested. According to the results, the variables that were not static in the level had been static as stating their first order differences the level and differences of the variables were tested via ADF test and the results were presented in Table 2.

Table 2. The Results of ADF Test before and after Getting the Difference

Variables	P Values Before Getting Difference (Level)			P Values After Getting First Order		
	Intercept	Tend and Intercept	None	Intercept	Tend and Intercept	None
LOGDPT	0.3042	0.0723	08060	0.0001	0.0029	0.0001
LOGEBHEM	0.4277	0.1856	0.6560	0.0001	0.0001	0.0001
LOGHEK	0.7431	0.1953	0.9935	0.0157	0.0169	0.0157

After getting the variables as static, the lag length of the study was determined via Vector Autoregressive (VAR) Model. Since the most preferable lag length through Likelihood Ratio, (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information Criterion (HQ) models was 2, the maximum lag length of ARDL analysis was selected as 2. In ARDL analysis, Schwarz Criterion was determined as model selection criteria. According to the analysis results, the most suitable model was 2, 0, 0, 1 model. For the analyses conducted in this study, Eviews 9 Program was used and the analyses were stated as 95% reliability level. The results of the analysis were presented in Table 3.

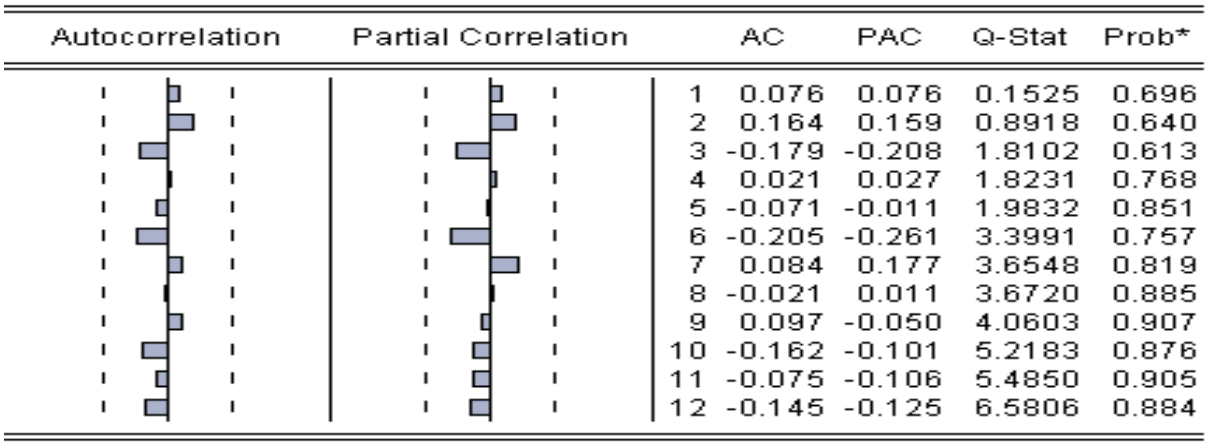
According to Table 3, the dependent variable namely D (LOGDPT) had two lag lengths and HTP independent variable had only one lag length; the other independent variables called as D(LOGEBHEM) and D(LOGHEK) also selected as optimum model with no lag length. In this designed model, it was understood that the model was statistically meaningful because of its' p value in F statistics ($p<0.005$); the model also supplied normality assumption due to p value in Jarque-Bera Test ($p>0.05$); the model did not have a problem on heteroscedasticity as seeing the p value in F statistics belonged to ARCH Heteroscedasticity Test ($p>0.05$); again the model did not have a problem on multiplexed connection since the p value ($p>0.05$) in F statistics given in Breusch-Godfrey Serial Correlation LM Test and finally, the model did not contain any model design error because it had p value ($p>0.05$) in F statistics on Ramsey Reset Test. Additionally, it was seen that the model did not have a spurious regression problem since its' Durbin-Watson value (1.80) was higher than its' R^2 value (0.56).

Table 3. ARDL Analysis Results

DependentVariable: D(LOGDPT)				
Selected Model: ARDL(2, 0, 0, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGDPT(-1))	-0.713426	0.191620	-3.723127	0.0018
D(LOGDPT(-2))	-0.325986	0.180489	-1.806122	0.0897
D(LOGEBHEM)	-0.098262	0.189948	-0.517311	0.6120
D(LOGHEK)	1.020900	0.866262	1.178513	0.2558
HTP	-0.202017	0.083621	-2.415861	0.0280
HTP(-1)	**0.252857**	**0.081900**	**3.087390**	**0.0071**
C	-0.023960	0.038614	-0.620517	0.5437
DiagnosticTests				
R-squared	0.563676	Akaikeinfocriterion		-2.100086
Adjusted R-squared	0.402555	Schwarzcriterion		-1.755301
S.E. of regression	0.048436	Hannan-Quinncriter.		-2.019073
Sumsquaredresid	0.084636	Durbin-Watson stat		1.807866
Loglikelihood	36.85384	RamseyReset Test (F Statistic)		0.2030
F-statistic	3.457136	Jarque-Bera Normality Test		0.8175
Prob(F-statistic)	0.022064	ARCH Heteroskedasticity Test (F Statistic)		0.2472
Meandependent var	0.009461	Breusch-GodfreySerialCorrelation LM Test (F Statistic)		0.5637
S.D. dependent var	0.093772			

Apart from the diagnostic tests conducted above, autocorrelation and semi-correlation between the variables were examined in terms of the all lag length positions of the model and it was seen that there was not any correlation relationship (Graphic 1).

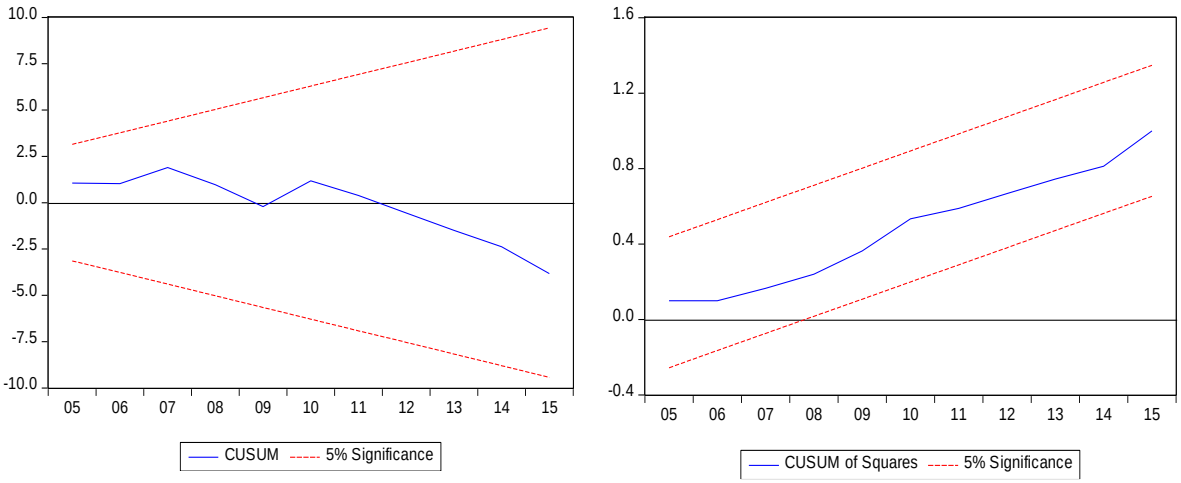
Graphic 1. The Graphic of Autocorrelation and Semi-correlation between the all Variables in ARDL Model



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	0.076	0.076	0.1525	0.696
		2	0.164	0.159	0.8918	0.640
		3	-0.179	-0.208	1.8102	0.613
		4	0.021	0.027	1.8231	0.768
		5	-0.071	-0.011	1.9832	0.851
		6	-0.205	-0.261	3.3991	0.757
		7	0.084	0.177	3.6548	0.819
		8	-0.021	0.011	3.6720	0.885
		9	0.097	-0.050	4.0603	0.907
		10	-0.162	-0.101	5.2183	0.876
		11	-0.075	-0.106	5.4850	0.905
		12	-0.145	-0.125	6.5806	0.884

In addition to the diagnostic tests mentioned above, the structural fraction problem on the data about the variables in the study was tested via Cusum and Cusum-SQ Test and it was seen that there was not a structural fraction problem of the model (Graphic 2).

Graphic 2. The results of Cusum and Cusum – SQ Fraction Test



According to the model designed in this study, it was seen that while there was statistically not a meaningful effect of D(LOGEBHEM) and D(LOGHEK) independent variables on D(LOGDPT) in a long term; a lag length position of HTP dependent variable had a meaningful effect in a long term. According to the model, the independent variables of this study could reveal the changes on dependent variables as 56% rates (R^2=0.56).

In this study, finally, an Error Correction Model (ECM) was designed. Error correction models are the models that explain the errors on co-integrated variables in a long term. Within the scope of this study, as determining the differences of variables to get them static leads to some losses as affecting the relationship between the variables in a long term. To correct these losses, the error correction models are designed.

Therefore, in this study, error correction model was used to determine how many terms are needed to correct the errors on dependent variables. In the scope of this error correction model, before using logarithmic transformation for variables, Ordinary Least Squares (OLS) regression analysis was applied as adding @TREND to the model of this study. As a result of ADF test, it was seen that the error terms on the results of OLS regression analysis were in a static level (RESID). Then, another OLS regression analysis was conducted as consisting of the lag length versions of independent variables. Those variables which were included in that analysis were the variables that were made static after logarithmic transformation and a lag length of error terms. The results were given in Table 4.

As it was seen in Table 4, the error terms were negative and they were statistically meaningful. It was concluded from this result that after one term, 96,8% of deviations on triple combined vaccines could be overcome. However, there was a positive and statistically meaningful effect of D(LOGHEK) independent variable on D(LOGDPT) dependent variable in a short term.

Table 4. The Results of Error Correction Model

DependentVariable: D(LOGDPT)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGEBHEM)	0.118889	0.182190	0.652555	0.5215
D(LOGHEK)	**1.835510**	**0.795636**	**2.306971**	**0.0319**
HTP	0.027804	0.030635	0.907616	0.3749
RESID(-1)	**-0.968925**	**0.211458**	**-4.582119**	**0.0002**
C	-0.058285	0.035310	-1.650691	0.1144
DiagnosticTests				
R-squared	0.547190	Meandependent var		0.010826
Adjusted R-squared	0.456627	S.D. dependent var		0.094521
S.E. of regression	0.069675	Akaikeinfocriterion		-2.313091
Sumsquaredresid	0.097092	Schwarzcriterion		-2.069315
Loglikelihood	33.91363	Hannan-Quinncriter.		-2.245478
F-statistic	6.042148	Durbin-Watson stat		2.000599
Prob(F-statistic)	0.002345			

As a result of the relationships for long and short term, it can be said that there was a statistically mean effect of HTP on vaccination in a long term and there was a statistically mean effect of the number of doctors on vaccination in a short term ($p<0.005$). It is thought that for those effects of HTP, especially, there was a positive effect of family medicine application that was firstly started in 2005 as a pilot study and then used in all cities in 2010.

3. Discussion

Vaccines are the most effective ways in terms of cost and reliability in order to protect child and adult health, to prevent communicable diseases (Arısoy et.al, 2015, p. 1-11). It is known that in the world, each year approximately 2-3 millions children who especially live in underdeveloped countries die because of the diseases which can be prevented via vaccines (WHO-UNICEF, 2014). It is thought that if global vaccinations are increased, 1,5 millions of these deaths can be prevented. The main principle of immunization services is to prevent diseases that can be controlled via vaccines for children and infants and to decrease morbidity

and mortality depending on infections. Briefly, the main aim of this service is to avert unvaccinated children (https://www.saglik.gov.tr; WHO, 2016).

According to the routine vaccine calendar, DPT vaccine is applied in 2, 4 and 6. months, booster vaccination dose is also used in 18. month for infants. According to the data stated by ministry of Health in 2014, the application rate of DPT was 86% around the world. According to WHO, the same rate was 95% in European countries. According to the data presented by Ministry of Health and TUIK, the rate of DPT was 68% in 2003; however, it increased 98% in 2016 (www.tuik.gov.tr; Başaran et al., 2015).

According to the results of the analyses concluded in this study, it was confirmed that there was not a meaningful effect of the numbers of nurses and midwives on vaccination as statistically; however the number of doctors had an effect in a short term and HTP had a positively meaningful effect on vaccination in a long term. It is possible to say that these increasing rates on vaccinations can be a result of family medicine application.

In a study conducted by Çalış for the aim of determining the current position of vaccination as stating December in 2006 for "The Period Before Family Medicine" (1998-2006 years) and "The Period After Family Medicine" (2007-2016) in Edirne; it was found that three doses of DPT were orderly determined as the rate of 79.9%, 78.9% and 79.3% in the period before family medicine; however, the same doses were orderly determined as 98%, 97.8% and 97.5% in the period after family medicine (Çalış, 2017, p. 32-34). The results stated in Çalış's study support the data presented in this study.

In another study which aimed to compare the vaccination rates between 1998-2007 in Bursa and which was conducted by Kizek et.al, the rates of three doses of DPT were orderly determined as 98.7%, 96.3% and 95.1% in 1998; however, the same rates were orderly determined as 89%, 87.3% and 86.4% in 2007. It is estimated that the reason of that decrease after the family medicine application in Kizek's study can be emigration in Bursa in those years (Kizek et.al., 2010, p. 613-622).

In Üstü and friends' study which was designed for the aim of comparing health elements in Erzurum between 2002-2008 years, the rate of DPT vaccine was 68% in 2002 although it was 90% in 2008 (Üstü et.al., 2009, p. 55-61). In their study about 11 cities in which family medicine application was firstly used in 2008, Nesanır and Erkman found that the rate of DPT vaccination in those cities was 90% in 2000, however the rate for the same

vaccine was calculated as 92% in 2007 (Nesanır & Erkman, 2010, p. 493-504). Similarly, as for Konya during the period of 1997-2007, in the study conducted by Bodur (2009), the rate of three doses of DPT was orderly found as 75%, 57% and 38% in 1997; however, it was orderly found as 93%, 88% and 79% in 2007 (Bodur, 2009, p. 117-124). As referring the data given in OECD, in this study, it was confirmed that the rate of DPT vaccination was 74% in Turkey in 1990; yet the rate of the same vaccination was increased in 97% in 2015.

In Töre's study which was compared difference between before and after the use family medicine application in Düzce in 2007, the rate of three doses of DPT was orderly found as 88%, 89% and 91% in the period before family medicine; however the same rates were orderly determined as 100%, 99% and 98% in the period after family medicine (Töre, 2007, p. 84). In the results of that study that found statistically mean difference between two periods supported the results of this study. In Çevik's study which was compared difference between before and after the use family medicine application in Manisa in the period of 2002-2012, the rate of the first dose of DPT was meaningfully high in the period after family medicine though there was not a mean difference between two periods in terms of the rates of the second and the third doses of the that vaccine (Çevik, 2013, p. 66-68). In this current study, also, it was seen that even the rate of DPT vaccination was 68% in 2003, there was a statistically mean increase in the use of DPT as getting 95% in 2015.

When the rates of DPT in some countries in 2014 were examined, it was seen that the rates of it were 94% in USA, 93% in Brazil, 99% in China, 96% in Germany, 99% in France, 99% in Belgium, 95% in England, 93% in Norway and 96% in Cuba. In the same year, the rates in Turkey were determined as 97% for the first dose, 96% for the second dose and 96% for the third dose (Ateş, 2016, p. 55-101).

Designed with ARDL method, in a study about the effects of per capita income, the rates of vaccination and educational costs on the expected life-long duration in birth in Iran for the period of 1980-2012, Agheli and Emamgholipour (2015) stated that vaccination had a positive effect on expected life duration in a long term and if the vaccination rate increase 1%, the rate of expected life duration will be increased 35% (Agheli & Emamgholipour, 2015, p. 427-437).

In this study, the effects of the number of nurses and midwives, the number of doctors and HTP consisting of important reforms on the rates of vaccination in infancy and childhood were examined via ARDL approach. In the field of health, there have been lots of studies

conducted via ARDL approach to analyze causality cases. Murthy and Okunade searched the effects of medical improvements occurred between 1960-2012, the number of citizens over 65 years and per capita income on the costs of research and development for health services as using ARDL approach. As a result of that study, it was revealed that medical improvements had an effect on costs of research and development for health services in a long term; however the age and per capita income had an effect on the same service in a short term (Murthy & Okunade, 2016, p. 67-73). Additionally, Saida and Kais examined the effects of carbon-emission rates in Sub-Saharan Africa countries in 1990-2015 on the health and costs of health as using ARDL approach and Granger causality analysis. As a result of that study, it was found that 1% increase in carbon-emission per citizen caused an increase in the costs of health services and in addition it caused an increase in the frequency of some diseases such as cholera and malaria (Saida & Kais, 2018, p. 2-15).

4. Conclusion

The quotation "Vaccination has greatly reduced the burden of infectious diseases. Only clean water, also considered to be a basic human right, performs better" is the best statement that reflects the value of vaccines on protecting health (Andre et.al, 2008, p. 140-146). Vaccines are seen as one of the biggest gain in terms of society health in the 20th century. The aim of vaccination is to protect from infectious diseases caused disabilities, side-effects and mortality, to improve immunity for unvaccinated people via high rates of vaccination, to prevent epidemics and to extinguish a diseases on a region or on the world. Nowadays, 68% of 7.7 millions of children under the age of five have been caused by infectious diseases, 1.5 million children have died because of pneumonia (700.000 of them have depended on pneumococcus), 1.3 million children have died due to diarrhea (527.000 of them have depended on rotavirus) and 730.000 children have died due to malaria. 25% of those deaths can be prevented via effective vaccination methods (Black et.al, 2010, p. 1069-1087).

It is seen that the number of vaccinated children and infants have been increased thanks to family medicine application which was started as a pilot in 2005 within the context of HTP that has been designed for the aim of developing active vaccination programs in 2003. The results of this study have also indicated that family medicine application has globally supported the activities on vaccination studiously. In general, there has been a clear increase

on the rates of vaccination in Turkey when the studies on the comparison of before and after the family medicine application have been searched in terms of HTP.

Before the family medicine, doctors had to reach much more patient populations, yet after family medicine, the number of patient per doctors has been decreased and so the quality of services has increased. It is thought that when the patient limits determined as approximately 4,000 people have been progressively decreased, health elements will be positively affected. With the common use of patient follow-up, administration and warning systems after the period of family medicine, following-up patients have been easier for doctors; the effective use of informatics systems have been resulted with the high health outputs like increasing in the rates of vaccinations.

It is seen that family medicine that is a part of HTP affects vaccination positively. However, for the aim of generalizing these positive factors, some kinds of applications are needed to be included in the system. Both in Turkey and in the world, many of vaccines are provided by the governments and these are injected to children free of charge. In this perspective, all of the private vaccines (like rotavirus) should be supplied by immunization contents in order to increase the rates of vaccination and reaching the services should not be prevented. Additionally, it is a necessity that families who don't want to get their children vaccinated due to lots of wrong information should be followed-up, informed, convinced and even punished as accepting it as a breach of law.

Within the scope of social state, all of services in health are innate rights gained in birth. To make future generations healthier and to sustain this health, each child has a right to live healthy, and vaccination is vital for each child.

In this study, since the total number of doctors, nurses and midwives working in the first step of family medicine in Turkey were not reached, the total number of doctors, nurses and midwives stated in OECD database were included in the analysis and it was determined as the limitation of this study. For the further studies, it is suggested that only the number of doctors, nurses and midwives working in family medicine may be included in a study in order to generalize the data for the whole universe.

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